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# DEVELOPING THROUGH PROTOTYPING: A RESOURCE MATERIAL ON USER INVOLVEMENT FOR WORKSPACE DESIGN

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*Keywords: participatory design, design process, co-design*

## 1. Introduction

The concept of participatory design and user involvement is well known and discussed among researchers [Simonsen and Robertson 2013]. Researchers, and also designers, now acknowledge the value of involving users and other stakeholders in the design process and the design results. The task of involving users in design processes is not, however, easy. There is a need of a resource material that manages to travel into a well-defined design work-practice and merge with it. Aiming at filling this gap, such a resource material was developed to merge user involvement within current designers' practices when designing new workspaces and it will be presented in this paper.

In recent years there has been an increasing desire to encourage new forms of collaboration and knowledge sharing when it comes to workspace design. There is a widespread interest in implementing user research and user involvement in major construction projects. It can be seen as an indication that builders, architects and design engineers are interested in getting closer to not only formal work processes but also to the everyday practice that new workspace design tends to support. Nevertheless, it is also often difficult to translate these contributions from users to workspace design that seriously take on board the employees' specific work practices as a platform for a desired change.

Each project is a social process influenced by different groups of people with different perspectives and values [Bucciarelli 1994]. For long-term, design occurred without users' participation, depending on the representations designers might have about what they were designing [Béguin 2000]. Complex systems design, however, must take into account the users' activity in order to be effective. One of the arguments for users' participation in design processes is exactly the improvement in result quality [Granath 2001]. Participatory design has its starting point at the rights people have, at work, of having a direct influence on decisions affecting their working lives. This approach enhances users' ability to act in the process, through organizational and political forces.

Many designers already realize the great source of information and knowledge users represent. However some resistance from design practitioners still remains. One reason that seems to prevent design practitioners from embracing new participatory frameworks is how it affects or more likely how they are concerned that it will affect their grounded practice. It can be a challenge to merge a participatory process with a design process already bound in tradition. Another reason many times raised by practitioners is how time consuming it is to involve users. It takes time planning the participatory design process, staging the interventions and activities and preparing the materials to be used. When having a participatory process in parallel with the design process, for example, designers have to manage two processes at the same time, ensure that they constantly feed into each other and keep them consistent.

Within the traditional design process, design practitioners still believe that if users are involved at all, it is either only very early in order to "harvest" user needs [Sanders 2002] and/or very late in order to

"test" a prototype [Ehn and Kyng 1991]. User needs are often harvested through individual questionnaires, interviews or perhaps through a focus group interview. In contrast, in participatory design practices the user involvement is the backbone of the whole design process in the sense that (potential) users and perhaps other stakeholders are involved in various activities throughout the design process. Here the users not only provide the design team with information but are invited in to take active part in the design work.

User involvement is increasingly getting more design-oriented and can be inspired by the design field (such as industrial design and service design) where co-design and co-creation has long been on the agenda. Design dialogues set the stage and employees, management and design practitioners are brought together to explore opportunities on the basis of the professional experience they each represent. Different materials (or objects) can help planning and performing participatory design processes. Several researchers have studied which kind of objects can be found in design processes [Ewenstein and Whyte 2009] and others have attempted to characterize different objects in relation to how well they function [Broberg et al. 2011].

The resource material developed brings up the design dialogues into focus and gives insights on how to stage them. But, different from other studied objects, it was developed through a prototyping process, together with its future users: the different stakeholders involved in designing new workspaces. The aim of this paper is to present the process through which this resource material was built: the use of prototyping sessions to develop a flexible material, aimed for architects, design engineers and health & safety consultants, in planning and performing participatory workspace design processes.

## 2. Methods

The resource material has been developed during the research project Workspace Design from 2011 to 2013. The research project is a collaboration between different institutions (Technical University of Denmark, Danish Technological Institute, Cowi and Royal Danish Academy of Fine Arts – School of Design) and different professions (architects, consultant engineers and researchers) with a shared focus on developing new work-practices, methods and techniques that involve users when designing new workspaces. In this project, architects, engineers and health & safety consultants have been called up to discuss and explore how this resource material about doing participatory design could become an asset for them when planning and performing a participatory design process. We have given our approach a general term – workspace:lab – strongly inspired by the design:lab [Binder and Brandt 2008]. This approach is a suggestion for participatory development processes where dialogue and experimentation are central, emphasizing joint exploration by the different stakeholders throughout the design process.

During the development process, we as researchers have struggled to find out both what the content of the material should be in order to be a resource material, and what format it should have in order to work in practice. By format we mean whether it should be like a formal book/handbook or it could have more open and interactive formats that would make it easier to travel from one practice to another. The integration of dialogue-oriented user involvement as part of the design process is complicated and depends on the given project and the methods designers are already familiar with. Thus we chose to communicate our experiences and approaches to design dialogues in such a way that it could be a resource for planning a user-involving design process.

We chose to develop this material in a participatory way, through a "prototyping process". It is worth emphasizing here the difference between prototypes and prototyping [Brodersen et al. 2008]. A prototype is an early sample or model of an artefact, usually built to test a concept or to act as something to be replicated or learned from. Prototyping, however, refers to the mutual learning process that takes place in a cooperative design setting. This method was used because in the process of constructing prototypes, we could discuss, explore, and try out various aspects of the new resource material with its prototypes and thus mediate communication among the different participants of the process.

We developed it throughout the project, content and format being gradually developed through participation. The initial drafts/prototypes were not meant to be definitive documents neither in their

form nor in content. The objective was to make the material available as it was prepared in order to serve as basis for analyses, discussions, suggestions and validations. We organized then three workshops to present the developed material and get feedback for the ongoing development process. The overview of the different sessions is presented in Table 1. The aim was to establish a dialogue with them on top of the material and work on its construction process.

**Table 1. Prototyping sessions overview**

| Workshop | Participants | Duration | Session format |
|---|---|---|---|
| Workshop 1 | 4 participants (all architects) | 2½ hour | Presentation of the material followed by the participants, divided into two groups, discussing and commenting among them on the first prototype. The session was finalized with a sum-up of the main comments of both groups on the material's content and format. |
| Workshop 2 | 11 participants (all health & safety consultants) | 3 hours | Presentation of the material followed by the participants, divided into three groups, discussing and commenting among them on the second prototype. The session was finalized with a sum-up of the main comments of the three groups on the material's content and format. |
| Workshop 3 | 8 participants (architects, consulting engineers and health & safety consultants) | 4 hours | Training course format: presentation of the material followed by the participants, divided into four groups, trying to use the resource material following specific steps we gave them. The session was finalized with a round of comments of all participants on how was the trial process of using the material. |

While developing the first prototype, we had a meeting among the researchers from the project team and we agreed on how it should look this "first version". The idea was that it should look like a prototype, meaning a not fully-finalized version so the participants could fill like commenting more. The first prototype, so called handbook, was designed as a manual with "recipes" on different types of design dialogues that could be used in a design process (Figure 1). The resource material had eight different spreads each containing a brief explanation on how to "do it yourself" and cards that could be removed and used independently. The cards gave the participants the opportunity to pick from a catalogue of methods and compose their own participatory process. The project team presented it to a group of four architects in the first workshop, which lasted two and a half hour in total. During the workshop, the participants were divided into two groups that worked with and discussed the resource material for one and a half hour.
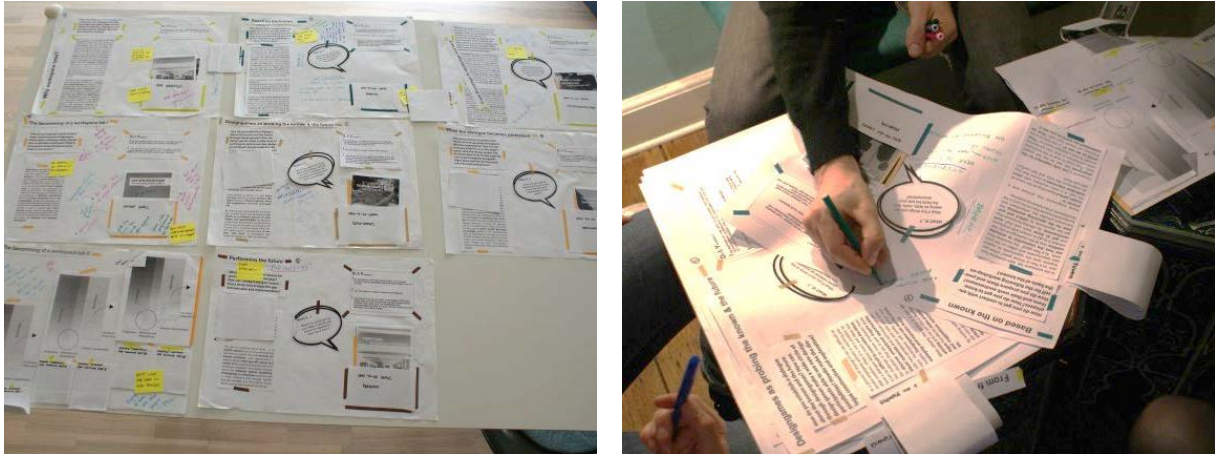
**Figure 1. First prototype and workshop**

Taking the comments from the first workshop into consideration, the revised version kept the main format idea – spreadsheets with pull out cards – but had a different way of organizing the ideas through the spreads (Figure 2). There were eight spreads, each containing method cards, case examples and still some explanation texts. At the second workshop this revised version of the prototype was presented to a group of eleven health & safety consultants from the same company. The workshop lasted three hours in total and the participants were divided into three groups that worked with and discussed the resource material for one and a half hour. Our dialogue gave us an understanding of the challenges the participants face in their practice.



**Figure 2. Second prototype and workshop**

Taking the participants' comments into consideration, we developed a third (and almost final) prototype of the resource material. For this prototype changes were more substantial, as we wanted to switch its use into a planning tool. In a subsequent training session, we introduced the material and its use for a group of eight participants among architects, consulting engineers and health & safety consultants. In the first two workshops, participants were asked to go through the material and comment on its content and format. In this session, instead, participants were asked to jointly discuss and outline how they would involve users and other stakeholders in their project during one and a half hour. The group sat together in pairs of professionals belonging to the same company with a project where user involvement was on the agenda. This training session gave us the final input to minor changes and adjustments of the resource material.

## 3. Results: the resource material

The prototyping process resulted in a "resource material" to be used as a tool that can help designers to build a participatory process specifically for each project they are facing. The last version of the

prototype turned into a toolbox containing (Figure3): 1) four booklets, 2) "playing" cards, 3) a game board, and 4) a leaflet explaining the main process the tool aims at bringing participants through. The booklets are the core of the toolbox and they aim at giving ideas and inspiration on methods and activities that can be part of the participatory process. The cards and the game board aim at making the use of the resource material a participatory and interactive activity in it. The leaflet provides some guidance to the so-called workspace:lab.



**Figure 3. Final prototype**

Each of the booklets has a main theme that we find essential across different workspace design projects. The first theme – *people at work* – communicates how designers should always prepare and give employees the opportunity to reflect on their existing workplace and equip them before meeting during a workshop. The booklet presents various methods that aim at "programming" the subsequent design process. The second theme – *workshop dialogues* – argues for using a series of workshops as the backbone of a participatory process and the booklet presents different formats that set the framework for a design dialogue during each workshop. The third theme – *design transformations* – focuses on how a professional designer deals with the material that comes out of the different activities together with the staff and how the designer may design his or her own design game. The fourth and last theme – *beyond the lab* – deals with the importance of ensuring a continued dialogue about space and work in a workplace. The booklet provides examples of how buildings change with new user requirements and how establishing a permanent workspace:lab creates a space for a continuing dialogue with users after the project has ended.

The playing cards have different functions in the "game" of planning a participatory process. The main cards have headlines and a corresponding image taken from the four booklets. The other cards are part of a so-called "directional map": some with questions like "who?", "what?", "where?"; others reminding participants to define the dilemmas present in the project. The game board consists of a grid format with a surface that makes it possible to write on it with a dry erase pen and erase it as many times as needed. It aims at providing a space for the dialogue: a place you can keep the cards on for a while or just take pictures to remember afterwards.

### 3.1. The feedbacks feeding the development process

During the prototyping process, feedbacks from the workshops were central to the development of the resource material. They allowed us to understand better what could be interesting for the different practitioners to learn from the material and how they were willing to use it. Apart from specific feedback on format and content of the different prototypes of the material, some more general comments led us to changes and improvements.

During the first workshop, for example, we confirmed that among architects and design engineers there is a great interest in tools that support and help organizing the dialogue with the employees. The architects found the cards in each spread a very interesting part of the material, as they were a good opening in their communication of a message or method. They also gave us feedback that led us to minimize standard instructions or prescriptions and to add drawing and schemas to faster communication of ideas for the following version of the resource material.

Differing from the first workshop, the participants of the second workshop were familiar more with many of the methods presented in the prototype and the challenge for them was to better negotiate the participatory process with the clients. This insight led to the idea of a resource material as a series of "conversation pieces" that would support and strengthen the dialogue between consultants and clients. Rather than seeing the material as a direct input to the employee dialogue, our interlocutors pointed that the material could support the planning of the design process tailored to the specific project in a way that creates space for a dialogue with the employees.

Last, during the training session, we could see the material in use. We observed that the dynamics of using the toolbox and the output of the session varied a lot among the participants. They found it very interesting that the material was open enough to leave a degree of freedom when using it. They found it provided a common language for them to discuss the project, helping to put thoughts into words when discussing either on a specific or on a more general level. However, even with the degree of freedom to use the material, if we were not there telling them what to do, the participants pointed out that they would miss an explanation on how to actually starting using the box and on the different possibilities it can offer.

### 3.2. The resource material in use

During the training session where participants were asked to use the resource material, we asked each of them to choose four main cards from the box, which they felt were relevant to think about in relation to their project. Then they were asked to place the cards one by one on the game board, explaining their choice and relating the cards to each other. After the first discussion, they were asked to use the other cards, choosing the ones they found relevant to the discussion on planning their project. As an example we present what two architects came up with during this session (Figure 4).



**Figure 4. Resource material in use**

The first 45 minutes were spent discussing the various cards and relating them to each other. They based their discussion on an actual project of a hospital refurbishment they were both participating in and where they wanted to involve the users. They had as a starting point that employees would have to move and their aim was to make the employees see the different possibilities in it. They would like to

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give the hospital staff the opportunity to try different solution scenarios and were inspired by one of the main cards to make a "living lab". In the booklet, they could read how a cultural centre has chosen to engage citizens in a continuing dialogue by establishing a physical "living lab" in a building that supports all forms of cooperation with citizens. The cultural centre "living lab" was established after the house was built, but the two architects used it as an example of how they wanted to stage user involvement even before the beginning of the construction.

Although participants had been invited to choose four cards each, the two architects needed to put more into play and began to group the selected cards in relation to different themes. A theme was about what kind of employees they should involve and how they should be grouped in relation to each other. The following set of cards was chosen because the architects wanted to start a dialogue with employees about their existing work environment. The architects described the existing environment as very rigid, which could be difficult to break out of for both management and employees. To break out of the very tight frame, the architects wanted them to mirror each other externally as well as internally by "twisting the well-known" and getting employees to help "imagining what could happen". They chose to put these statements into play by developing their own dialogue game that would frame their first workshop with selected employees as participants.

The game they developed along the way had clear references to a game board presented in one of the booklets. The architects, however, modified it in relation to the project they faced and in relation to the methods they have previously benefited from in other projects. The architects then grouped the various cards with statements that, to use their own words, should lead participants "into the frame again". A final theme was about "lack of leadership" and a desire from the architects to embrace all employees and "let the client take over" as one of the playing cards indicated.

Along the way, they placed arrows which helped them to focus their planning. The cards questioning "who?" made them consider what type of user they were dealing with. The architects had a feeling that the users were very defensive and they re-evaluated their approach to user involvement and customized their workshops so they were more in line with those involved. They also used arrows to question each other about other issues they had not previously been aware of. They took pictures of the game board in the end and were happy they in fact used the time during the session to solve some planning issues for their project.

## 4. Discussion

The aim of this paper was to present the development process of a resource material built to bridge the gap of merging user involvement with current designers' practices when designing new workspaces. The prototyping process proved to be a valuable method to develop this material. Not only the material changed from an initial handbook into a toolbox, but also its content and the possible ways of using it changed throughout the whole process. The joint exploration of the material together with the participants gave us insights on their different needs and on how they could envision using it. At the first two workshops, having a rough draft version of the material also encouraged the participants in commenting on it. They mention that this way they felt more comfortable than with a rather final version of a material. The idea was exactly to give them the feeling they were really part of the process of building this material with us, rather than just "testing" it.

As we see it, the example of use of the material shows that it became a resource and an asset that streamlined the planning of a participatory process, while putting the key themes within user involvement and workspace design on the agenda. Looking at what the participants produced during the exercise, we see that the participants have merged the themes and approaches presented in the toolbox into their own experience with user involvement and the design practice they are part of. Although we do not actively participate in the planning, our voice was still evident. The dialogue of the two architects was based on the context of the employees, involving them in the design process by letting them imagine new solutions all together. They also thought of how the dialogue about space and work could be pursued and how management could take over when they leave the project.

The participants used the cards relating them to each other in new ways and a statement that related to a particular method in the booklets was now relevant in new contexts. Fragments and statements from other participatory processes could be put together and create new ways of user involvement based on

the project they are currently in. The cards proved to be open enough to allow this freedom and the participants appreciated that they could use the cards even without checking the booklets. Each part of the resource material, to a certain extent, can stand alone. However, when used together, they complement each other.

Even though the results were very positive, we can still see room for improvement. In a short term, developing some "rules for the game" the toolbox offers is on the agenda, so the box could stand alone. On a long term, we see the resource material as an open source, where new methods and inspiring ideas can always be added.

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